Abstracts

Oral 5

Low back pain

O5.1 CARDIOVASCULAR RISK FACTORS, STRENUOUSNESS OF WORK, AND LOW BACK PAIN: A 28 YEAR FOLLOW UP OF INDUSTRIAL EMPLOYEES

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Introduction: It has been proposed that atherosclerosis of the lumbar vessels may lead to low back pain (LBP). We studied whether classic risk factors of cardiovascular disease were predictive of increased LBP among a cohort of industrial employees, when physical workload was taken into account.
Methods: A sample (n = 902) stratified by sex, age, and occupational class was drawn from among employees in an engineering company in 1973, and examined for serum total cholesterol (S-Chol) and triglyceride (S-Trigl) concentrations, blood pressure, body mass index (BMI), smoking, leisure time physical activity, self-reported cardiac diseases, physical workload, and LBP (frequency of local and radiating pain). A composite score was constructed as the sum of tertiles of the seven cardiovascular risk factors. As of November 2000, 232 subjects had died, 108 for cardiovascular causes. In 2000, 546 (81% of the survivors) responded to a follow up questionnaire on for example, LBP.
Results: Self-reported cardiac diseases were associated with LBP. In men free of cardiac disease at baseline, an increased LBP score during the 28 year follow up was predicted by smoking (stopped *v* never: OR 2.04; 95% CI 1.13 to 3.69 and current *v* never: 2.05; 1.13 to 3.72), BMI (high tertile *v* low: 2.95; 1.57 to 5.55), S-Chol (1.96; 1.06 to 3.60), S-Trigl (2.33; 1.30 to 4.19), and systolic (2.91; 1.57 to 5.41) and diastolic (1.95; 1.05 to 3.61) blood pressure, when adjusted for age and occupational class. In a total model, the effects of smoking, BMI, SBP, and work strenuousness remained statistically significant. The composite score showed a graded association pattern (middle tertile *v* low: 2.32; 1.23 to 4.30, high *v* low: 4.39; 2.23 to 8.66) independent of age and strenuousness of work that also predicted increased LBP (middle tertile *v* low: 2.34; 1.22 to 4.48, high *v* low: 2.11; 1.09 to 4.06). In women only occupational class (blue collar *v* white collar: 3.22; 1.68 to 6.18) was associated with increased LBP.
Conclusions: In men, high levels of cardiovascular risk factors and physical strenuousness of work independently predicted increased LBP. In women blue collar occupational class was of main importance.

O5.2 DURATION OF EXPOSURE TO PHYSICAL WORK FACTORS AND VARIOUS DIMENSIONS OF LOW BACK PAIN IN THE GAZEL COHORT

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Introduction: Various dimensions of low back pain (LBP), such as sciatica or chronic pain, may be associated with different occupational risk factors. The objectives of this study were to see whether cumulative exposure to specific physical risk factors predicted different types of LBP, and also to quantify the effects of the number of years of exposure.
Methods: The study population comprised 2601 subjects of both sexes in the GAZEL cohort who completed in 1996 a questionnaire focussing on occupational exposure in the past, and in 2001 a questionnaire describing LBP in the past 12 months. In 1996 men in this cohort were 47–57 years old, women 42–57 years old. Three risk factors were considered: bending forward and backward or trunk rotation; driving more than two hours a day; pulling/pushing heavy loads. Each one was quantified by the duration of exposure in years. Personal and psychosocial factors at work were taken into account as confounding factors. Four outcomes were studied with logistic models, separately for men and women: any LBP, LBP lasting more than 30 days, LBP radiating to the leg, LBP radiating below the knee (considered here as sciatica).
Results: The final models, taking into account the main risk factors, gave the following results, with ORs for 20 years of exposure: bending and trunk rotation was significantly associated with any LBP for men (OR = 1.37), LBP of more than 30 days for men (OR = 2.2) and women (OR = 2.0), and LBP radiating to the leg for women (OR = 1.95). Driving was significantly associated with any LBP for men (OR = 1.24), LBP of more than 30 days for women (OR = 3.15) and LBP radiating to the leg for men (OR = 1.43). Pushing and pulling heavy loads was associated only with LBP radiating below the knee, significantly for men (OR = 2.23) and with borderline significance (p = 0.07) for women (OR = 3.39).
Conclusion: This study gave dose-response relations according to duration of exposure. Even for 20 years of exposure, some ORs were relatively small, which suggests that long term effects might be limited, or that self-assessed duration is not the best evaluation for ''dose'' of exposure. Bending or trunk rotation, and driving, seem to be risk factors for several dimensions of LBP. However, having to pull and push heavy loads for many years might be a risk factor specific for sciatica.

O5.3 EPIDEMIOLOGY OF LOWER BACK PROBLEMS AMONG SOUTH AFRICAN STEEL WORKERS

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Introduction: Lower back problems (LBP) affect more workers and result in higher costs to industry than any other musculoskeletal disorder. The importance of regional and industrial specific studies, especially in developing countries, is absolutely necessary in the understanding of industrial LBP. Contemporary thought indicates that back disorders are multifactorial in origin and may be associated with occupational, psychosocial, and non-work related factors and characteristics. The purpose of this study was to determine the prevalence and aetiology of LBP among workers in a South African steel industry.
Methods: The design entailed an analytical cross sectional epidemiological study among a group of 366 steel plant workers. Outcome was determined from a guided questionnaire using open questions, functional rating, and complaint indexes. Exposure was determined using self-reported questionnaires to measure personal, psychosocial, and occupational factors.
Results: Multivariate logistic regression analyses indicated significant ($p \leqslant 0.05$) adjusted odds ratios (OR) for twisting and bending (OR 2.81; 95% CI 1.02 to 7.73), sitting (2.33; 1.01 to 5.37), kneeling and squatting (4.62; 1.28 to 16.63), load carriage (7.20; 1.60 to 32.37), bulky manual handling (5.58; 1.16 to 26.71), working on slippery and uneven surfaces (3.63; 1.20 to 10.98), work related fear avoidance beliefs (3.40; 2.20 to 5.25), catastrophising (1.31; 1.01 to 1.7), and pain coping self statements (1.47; 1.16 to 1.87). Significant protective associations were found between control over order and pace of work tasks (OR 0.33; 95% CI 0.13 to 0.83) and for increased activity levels (OR 0.57; 95% CI 0.42 to 0.78).
Conclusion: This study confirms the current view of a multifactorial aetiological approach to idiopathic LBP, and emphasises the importance of multiple intervention strategies.

O5.4 PREDICTING THE LONG TERM COURSE OF LOW BACK PAIN AND ITS CONSEQUENCES FOR SICKNESS ABSENCE AND ASSOCIATED WORK DISABILITY

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Introduction: Low back pain is characterised by a dynamic pattern of episodes and recovery but little is known about the long term course of back pain because of a lack of cohort studies with sufficiently long follow up periods.
Methods: A cohort of 523 workers in nursing homes and homes for the elderly was followed for two years. Physical load was measured by observations at the workplace. Psychosocial factors at work, individual characteristics, and low back pain were determined by questionnaire once a year. The effect of work load on low back pain and the transition of low back pain into sickness absence was calculated with logistic regression analysis. A Markov model was used to construct a

hypothetical cohort of workers with follow up of 40 years (40 cycles of 1 year) with transitional probabilities between no complaints, low back pain, and sickness caused by low back pain. Permanent disability was used as end state of health.
Results: The transitional probability from no complaints to low back pain varied between p = 0.25 and p = 0.29, from low back pain to sickness absence between p = 0.09 and p = 0.25, and recurrence of sickness absence varied between p = 0.27 and p = 0.50, depending on the level of physical load. During a 40 year career, total sickness absence as a result of low back pain was approximately 140 weeks (6.6%) among workers with high physical load and about 30 weeks (1.4%) among those with low physical load.
Conclusion: The Markov approach illustrated the potential impact of physical load on (permanent) disability caused by low back pain among workers with exposure to physcial load. These consequences may go unnoticed in cohort studies with follow up periods of a few years.

O5.5 IS AN IMBALANCE BETWEEN WORKLOAD AND PHYSICAL CAPACITY A RISK FACTOR OF LOW BACK, NECK, AND SHOULDER PAIN?

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Introduction: High workload or low physical capacity can cause musculoskeletal disorders. The objective of this study was to investigate if an imbalance between workload and physical capacity was a risk factor for low back, neck, and shoulder pain.
Methods: Data were used of the longitudinal study on musculoskeletal disorders, absenteeism, stress, and health (SMASH) with a follow up of three years (n = 1789). At baseline, physical workload was observed using video observations and physical capacity (isokinetic lifting strength, static muscle endurance, and mobility of the spine) was measured. During follow up, low back, neck, and shoulder pain were self-reported annually. Imbalance between workload and physical capacity was defined as higher than median workload and lower than median physical capacity. The data were analysed using logistic generalised estimation equations (GEE).
Results: In general, an imbalance between workload and physical capacity increased the risk of musculoskeletal disorders, although on this pattern some exceptions were found. Adjusted for confounders, an imbalance between the working time with the trunk in $\geqslant 30^{\circ}$ flexion and static endurance of the back extensors increased the risk of low back pain (OR 1.29 (0.99 to 1.68). Furthermore, an imbalance between the working time with the trunk in $\geqslant 90^{\circ}$ flexion or $\geqslant 30^{\circ}$ rotation and maximum mobility of the spine increased the risk of low back pain (ORs 1.37 (1.04 to 1.79) and 1.37 (1.04 to 1.81) for flexion and rotation, respectively). Imbalance between the working time with the neck in $\geqslant 20^{\circ}$ flexion and endurance time of the neck flexors increased the risk of neck pain (OR 1.79 (1.24 to 2.59)). No relation was found between an imbalance of lifting at work and isokinetic lifting strength, nor for an imbalance of working with arms in elevation and endurance of the shoulder elevators.
Conclusion: The results of this study suggest that an imbalance between workload and physical capacity can be a risk factor for low back or neck pain.